

## SEQUENCE LISTING

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&lt;120&gt; MODIFICATION OF POLYSACCHARIDE CONTAINING MATERIALS

&lt;130&gt; 00/20910

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&lt;160&gt; 13

&lt;170&gt; PatentIn version 3.0

&lt;210&gt; 1

&lt;211&gt; 507

&lt;212&gt; DNA

&lt;213&gt; Clostridium cellulovorans

&lt;400&gt; 1

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atgacgtaaa agttagatat tattacacaa gtgatggtac acaaggacaa actttctggt      180
gtgaccatgc tgggtgcatta ttaggaaata gctatggtga taacactagc aaagtgcag      240
caaaacttcgt taaagaaaca gcaagcccaa catcaaccta tgatacatat gttgaatttg      300
gatttgcaag cggacgagct actcttaaaa aaggacaatt tataactatt caaggaagaa      360
taacaaaatc agactggtca aactacactc aaacaaatga ctattcattt gatgcaagta      420
gttcaacacc agttgtaaat caaaagttta caggatatat aggtggagct aaagtacttg      480
gtacagcacc ataggatcca gatgtac                                          507
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&lt;210&gt; 2

&lt;211&gt; 163

&lt;212&gt; PRT

&lt;213&gt; Clostridium cellulovorans

&lt;400&gt; 2

Met Ala Ala Thr Ser Ser Met Ser Val Glu Phe Tyr Asn Ser Asn Lys

1 5 10 15

Ser Ala Gln Thr Asn Ser Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr

20 25 30

Ser Asp Ser Asp Leu Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr

35 40 45

Thr Ser Asp Gly Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala Gly  
 50 55 60  
 Ala Leu Leu Gly Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr Ala  
 65 70 75 80  
 Asn Phe Val Lys Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr  
 85 90 95  
 Val Glu Phe Gly Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln  
 100 105 110  
 Phe Ile Thr Ile Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr  
 115 120 125  
 Thr Gln Thr Asn Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro Val  
 130 135 140  
 Val Asn Pro Lys Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly  
 145 150 155 160  
 Thr Ala Pro

<210> 3

<211> 573

<212> DNA

<213> Clostridium cellulovorans

<400> 3

ccatgtcagt tgaattctac aactctaaca aatcagcaca aacaaactca attacaccaa 60  
 taatcaaaat tactaacaca tctgacagtg atttaaattt aaatgacgta aaagttagat 120  
 attattacac aagtgatggt acacaaggac aaactttctg gtgtgaccat gctggtgcat 180  
 tattaggaaa tagctatggt gataaacacta gcaaagtgac agcaaacttc gttaaagaaa 240  
 cagcaagccc aacatcaacc tatgatacat atgttgaatt tggatttgca agcggacgag 300  
 ctactcttaa aaaaggacaa ttataacta ttcaaggaag aataacaaaa tcagactggt 360  
 caaactacac tcaaacaat gactattcat ttgatgcaag tagttcaaca ccagttgtaa 420  
 atccaaaagt tacaggatat ataggtggag cttaaagtact tggtagcagca ccaggtccag 480  
 atgtaccatc ttcaataatt aatcctactt ctgcaacatt tgatcccggg accatggcta 540  
 gcatgactgg tggacagcaa atgggtcgga tcc 573

<210> 4

<211> 190

<212> PRT

<213> Clostridium cellulovorans

<400> 4

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1           5           10           15
Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp Leu Asn
20           25           30
Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly Thr Gln
35           40           45
Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser
50           55           60
Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr
65           70           75           80
Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala
85           90           95
Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly
100          105          110
Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr
115          120          125
Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys Val Thr
130          135          140
Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro Gly Pro Asp
145          150          155          160
Val Pro Ser Ser Ile Ile Asn Pro Thr Ser Ala Thr Phe Asp Pro Gly
165          170          175
Thr Met Ala Ser Met Thr Gly Gly Gln Gln Met Gly Arg Ile
180          185          190

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<210> 5

<211> 1030

<212> DNA

<213> Clostridium cellulovorans

<400> 5

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taatcaaaat tactaacaca tctgacagtg atttaaattt aaatgacgta aaagttagat    120
attattacac aagtgatggt acacaaggac aaactttctg gtgtgaccat gctggtgcat    180
tattaggaaa tagctatggt gataacacta gcaaagtgac agcaaacttc gttaaagaaa    240

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cagcaagccc aacatcaacc tatgatacat atgttgaatt tggatttgca agcggacgag 300  
 ctactcttaa aaaaggacaa ttataacta ttcaaggaag aataacaaaa tcagactggt 360  
 caaactacac tcaaacaat gactattcat ttgatgcaag tagttcaaca ccagttgtaa 420  
 atccaaaagt tacaggatat ataggtggag ctaaagtact tggtagca caaggtccag 480  
 atgtaccatc ttcaataatt aatcctactt ctgcaacatt tgatcccggt accatggcag 540  
 cgacatcatc aatgtcagtt gaattttaca actctaaca atcagcacia acaaactcaa 600  
 ttacaccaat aatcaaaatt actaacacat ctgacagtga tttaaattta aatgacgtaa 660  
 aagttagata ttattacaca agtgatggta cacaaggaca aactttctgg tgtgaccatg 720  
 ctggtgcatt attaggaaat agctatgttg ataacactag caaagtga gcaaacttcg 780  
 ttaagaaac agcaagccca acatcaacct atgatacata tgttgaattt ggatttgcaa 840  
 gcggacgagc tactcttaaa aaaggacaat ttataactat tcaaggaaga ataacaaat 900  
 cagactggtc aaactacact caaacaatg actattcatt tgatgcaagt agttcaacac 960  
 cagttgtaaa tccaaaagtt acaggatata taggtggagc taaagtactt ggtacagcac 1020  
 cataggatcc 1030

<210> 6

<211> 340

<212> PRT

<213> Clostridium cellulovorans

<400> 6

Met Ser Val Glu Phe Tyr Asn Ser Asn Lys Ser Ala Gln Thr Asn Ser  
 1 5 10 15  
 Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp Leu Asn  
 20 25 30  
 Leu Asn Asp Val Lys Val Arg Tyr Tyr Thr Ser Asp Gly Thr Gln  
 35 40 45  
 Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser  
 50 55 60  
 Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr  
 65 70 75 80  
 Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala  
 85 90 95  
 Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly  
 100 105 110  
 Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr  
 115 120 125

Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys Val Thr  
 130 135 140  
 Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro Gly Pro Asp  
 145 150 155 160  
 Val Pro Ser Ser Ile Ile Asn Pro Thr Ser Ala Thr Phe Asp Pro Gly  
 165 170 175  
 Thr Met Ala Ala Thr Ser Ser Met Ser Val Glu Phe Tyr Asn Ser Asn  
 180 185 190  
 Lys Ser Ala Gln Thr Asn Ser Ile Thr Pro Ile Ile Lys Ile Thr Asn  
 195 200 205  
 Thr Ser Asp Ser Asp Leu Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr  
 210 215 220  
 Tyr Thr Ser Asp Gly Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala  
 225 230 235 240  
 Gly Ala Leu Leu Gly Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr  
 245 250 255  
 Ala Asn Phe Val Lys Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr  
 260 265 270  
 Tyr Val Glu Phe Gly Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly  
 275 280 285  
 Gln Phe Ile Thr Ile Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn  
 290 295 300  
 Tyr Thr Gln Thr Asn Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro  
 305 310 315 320  
 Val Val Asn Pro Lys Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu  
 325 330 335  
 Gly Thr Ala Pro  
 340

<210> 7

<211> 1288

<212> DNA

<213> recombinant nucleotide sequence

<220>

<221> misc\_feature

<222> (3)..(791)

<223> pRIT2T cloning vector

<220>

<221> misc\_feature

<222> (795)..(1280)

<223> from cbpA gene

<400> 7

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ccatggaaca acgcataacc ctgaaagaag cttgggatca acgcaatggt tttatccaaa      60
gccttaaaga tgatccaagc caaagtgcta acgttttagg tgaagctcaa aaacttaatg      120
actctcaagc tccaaaagct gatgcgcaac aaaataactt caacaaagat caacaaagcg      180
ccttctatga aatcttgaac atgcctaact taaacgaagc gcaacgtaac ggcttcattc      240
aaagtcttaa agacgaccca agccaaagca ctaacgtttt aggtgaagct aaaaaattaa      300
acgaatctca agcaccgaaa gctgataaca atttcaacaa agaacaacaa aatgctttct      360
atgaaatctt gaatatgcct aacttaaacy aagaacaacy caatggtttc atccaaagct      420
taaaagatga cccaagccaa agtgctaacc tattgtcaga agctaaaaag ttaaatgaat      480
ctcaagcacc gaaagcggat aacaaattca acaaagaaca acaaaatgct ttctatgaaa      540
tcttacattt acctaaactta aacgaagaac aacgcaatgg tttcatccaa agcctaaaag      600
atgacccaag ccaaagcgct aaccttttag cagaagctaa aaagctaaat gatgctcaag      660
caccaaaagc tgacaacaaa ttcaacaaag aacaacaaaa tgctttctat gaaattttac      720
atttacctaa cttaactgaa gaacaacgta acggcttcat ccaaagcctt aaagacgatc      780
cggggaattc catggcagcg acatcatcaa tgtcagttga attttacaac tctaacaat      840
cagcacaaac aaactcaatt acaccaataa tcaaaattac taacacatct gacagtgatt      900
taaattttaaa tgacgtaaaa gttagatatt attacacaag tgatggtaca caaggacaaa      960
ctttctggtg tgaccatgct ggtgcattat taggaaatag ctatgttgat aactactagca     1020
aagtgcagc aaacttcggt aaagaaacag caagcccaac atcaacctat gatacatatg     1080
ttgaatttgg atttgcaagc ggacgagcta ctcttaaaaa aggacaattt ataactattc     1140
aaggaagaat aacaaaatca gactgggtcaa actacactca aacaaatgac tattcatttg     1200
atgcaagtag ttcaacacca gttgtaaatc caaaagttac aggatatata ggtggagcta     1260
aagtacttgg tacagcacca taggatcc                                     1288

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<210> 8

<211> 426

<212> PRT

<213> recombinant protein sequence

<220>

<221> misc\_feature

<222> (1)..(263)

<223> protein A from cloning vector

<220>

<221> misc\_feature

<222> (265)..(426)

<223> CBPA

<400> 8

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Met Glu Gln Arg Ile Thr Leu Lys Glu Ala Trp Asp Gln Arg Asn Gly
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Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Val Leu
           20           25           30
Gly Glu Ala Gln Lys Leu Asn Asp Ser Gln Ala Pro Lys Ala Asp Ala
           35           40           45
Gln Gln Asn Asn Phe Asn Lys Asp Gln Gln Ser Ala Phe Tyr Glu Ile
           50           55           60
Leu Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln
65           70           75           80
Ser Leu Lys Asp Asp Pro Ser Gln Ser Thr Asn Val Leu Gly Glu Ala
           85           90           95
Lys Lys Leu Asn Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn
           100          105          110
Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu
           115          120          125
Asn Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro
           130          135          140
Ser Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser
145          150          155          160
Gln Ala Pro Lys Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala
           165          170          175
Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn
           180          185          190
Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu
           195          200          205
Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp
           210          215          220
Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His
225          230          235          240

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Leu Pro Asn Leu Thr Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu  
 245 250 255  
 Lys Asp Asp Pro Gly Asn Ser Met Ala Ala Thr Ser Ser Met Ser Val  
 260 265 270  
 Glu Phe Tyr Asn Ser Asn Lys Ser Ala Gln Thr Asn Ser Ile Thr Pro  
 275 280 285  
 Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp Leu Asn Leu Asn Asp  
 290 295 300  
 Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly Thr Gln Gly Gln Thr  
 305 310 315 320  
 Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser Tyr Val Asp  
 325 330 335  
 Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr Ala Ser Pro  
 340 345 350  
 Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala Ser Gly Arg  
 355 360 365  
 Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly Arg Ile Thr  
 370 375 380  
 Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr Ser Phe Asp  
 385 390 395 400  
 Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys Val Thr Gly Tyr Ile  
 405 410 415  
 Gly Gly Ala Lys Val Leu Gly Thr Ala Pro  
 420 425

<210> 9

<211> 984

<212> DNA

<213> recombinant nucleotide sequence

<220>

<221> misc\_feature

<222> (68)..(624)

<223> taken from Clostridium cellulovorans

<220>

<221> misc\_feature

<222> (652)..(981)



<223> taken from bovine

<400> 9

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catatgaaag aaaccgctgc tgctaaattc gaacgccagc acatggacag cccagatctg      60
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aactctaaca aatcagcaca aacaaactca attacaccaa taatcaaaat tactaacaca      180
tctgacagtg atttaaattt aaatgacgta aaagttagat attattacac aagtgatggt      240
acacaaggac aaactttctg gtgtgaccat gctggtgcat tattaggaaa tagctatggt      300
gataacacta gcaaagtgac agcaaacttc gttaaagaaa cagcaagccc aacatcaacc      360
tatgatacat atgttgaatt tggatttgca agcggacgag ctactcttaa aaaaggacaa      420
tttataacta ttcaaggaag aataacaaaa tcagactggt caaactacac tcaaacaat      480
gactattcat ttgatgcaag tagttcaaca ccagttgtaa atccaaaagt tacaggatat      540
ataggtggag ctaaagtact tggtagagca ccaggtccag atgtaccatc ttcaataatt      600
aatcctactt ctgcaacatt tgatccccgt accatggggt ctcctcctgg aagcacttcc      660
gctgccagca gctccaacta ttgcaaccag atgatgaaga gccggaacct gaccaaagat      720
cgatgcaagc cagtgaacac ctttgtgcac gagtccctgg ctgatgtcca ggccgtgtgc      780
tcccagaaaa atgttgctg caagaatggg cagaccaatt gctaccagag ctactccacc      840
atgagcatca ccgactgccg tgagaccggc agctccaagt accccaactg tgcctacaag      900
accaccaggg cgaataaaca catcattgtg gcttgtgagg gaaacccgta cgtgccagtc      960
cacttcgacg cttcagtgtg gatc                                     984

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<210> 10

<211> 326

<212> PRT

<213> recombinant protein sequence

<220>

<221> misc\_feature

<222> (30)..(208)

<223> taken from Clostridium cellulovorans

<220>

<221> misc\_feature

<222> (226)..(326)

<223> taken from bovine

<400> 10

His Met Lys Glu Thr Ala Ala Ala Lys Phe Glu Arg Gln His Met Asp

1 5 10 15

Ser Pro Asp Leu Gly Thr Leu Val Pro Arg Gly Ser Met Ala Ala Thr

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Ser Ser Met Ser Val Glu Phe Tyr Asn Ser Asn Lys Ser Ala Gln Thr		
35	40	45
Asn Ser Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp		
50	55	60
Leu Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly		
65	70	75
Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly		
85	90	95
Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys		
100	105	110
Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly		
115	120	125
Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile		
130	135	140
Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn		
145	150	155
Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys		
165	170	175
Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro Gly		
180	185	190
Pro Asp Val Pro Ser Ser Ile Ile Asn Pro Thr Ser Ala Thr Phe Asp		
195	200	205
Pro Gly Thr Met Gly Pro Pro Pro Gly Ser Thr Ser Ala Ala Ser Ser		
210	215	220
Ser Asn Tyr Cys Asn Gln Met Met Lys Ser Arg Asn Leu Thr Lys Asp		
225	230	235
Arg Cys Lys Pro Val Asn Thr Phe Val His Glu Ser Leu Ala Asp Val		
245	250	255
Gln Ala Val Cys Ser Gln Lys Asn Val Ala Cys Lys Asn Gly Gln Thr		
260	265	270
Asn Cys Tyr Gln Ser Tyr Ser Thr Met Ser Ile Thr Asp Cys Arg Glu		
275	280	285
Thr Gly Ser Ser Lys Tyr Pro Asn Cys Ala Tyr Lys Thr Thr Gln Ala		
290	295	300
Asn Lys His Ile Ile Val Ala Cys Glu Gly Asn Pro Tyr Val Pro Val		

305                      310                      315                      320

His Phe Asp Ala Ser Val

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<210> 11
<211> 24
<212> DNA
<213> Synthetic Oligonucleotide;
<400> 11
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<210> 12
<211> 18
<212> DNA
<213> Synthetic Oligonucleotide;
<400> 12
gggggatcct atggtgct
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<210> 13
<211> 22
<212> DNA
<213> Synthetic Oligonucleotide;
<400> 13
ggggggtacc atggaacaac gc
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